

Amendments to the Claims

Listing of the Claims

Following is a listing of all claims in the present application, which listing supersedes all previously presented claims:

1. (Currently Amended) A ~~decoding method of decoding time division multiplexed data using the Viterbi decoding method, wherein the multiplexed data are composed by time division multiplexing including~~ a plurality of data streams including at least convolutionally encoded with different coding rates and modulated using any one of BPSK, QPSK, and 8PSK data streams, the multiplexed data are coded with at least a convolution code, and a coding rate and a modulation scheme are set individually for each of the data streams, the decoding method comprising the steps of:

decoding, using a Viterbi decoding algorithm, a first data stream that is included in the time division multiplexed data and modulated using any one of 8PSK and QPSK;

decoding, using the Viterbi decoding algorithm, a second data stream that is included in the time division multiplexed data and modulated using any one of QPSK or BPSK; and

initializing a path metric calculated based on the Viterbi decoding method, at a moment when the 8PSK data stream is changed into the QPSK data stream or BPSK data stream, or when the QPSK data stream is changed into the BPSK data stream so that the path metric is not calculated based on a previously input data stream that includes errors, after completion of the decoding of the first data stream and before performing the decoding of the second data stream, a path metric that has been

calculated before the completion of the decoding of the first data stream, except when both the first data stream and the second data stream are modulated using QPSK.

2. (Currently Amended) The ~~decoding~~ method according to claim 1, wherein the path metric is initialized ~~only if~~ when a coding rate of the a second data stream ~~to be decoded subsequently to a first data stream that has been decoded~~ is larger than a coding rate of the first data stream.

3. (Currently Amended) A data receiving system comprising:
a Viterbi decoder ~~which decodes~~ that decodes time division multiplexed data ~~composed by time division multiplexing including~~ a plurality of data streams ~~including at least~~ convolutionally encoded with different coding rates and modulated using any one of BPSK, QPSK, and 8PSK data streams, the multiplexed data coded with at least a convolution code, a coding rate and a modulation scheme being set individually for each of the data streams; and

an initialization signal generation unit ~~which outputs an initialization signal for initializing a path metric calculated by said Viterbi decoder, at a moment when the 8PSK data stream is changed into the QPSK data stream or BPSK data stream, or when the QPSK data stream is changed into the BPSK data stream so that the path metric is not calculated based on a previously input data stream that includes errors~~ that outputs an initialization signal for a path metric to the Viterbi decoder after completion of decoding of a first data stream, which is included in the time division multiplexed data and modulated using any one of 8PSK and QPSK, and before performing decoding of a

second data stream, which is included in the time division multiplexed data and modulated using any one of QPSK and BPSK, except when both the first data stream and the second data stream are modulated using QPSK.

4. (Currently Amended) The data receiving system according to claim 3, further comprising a signal selection ~~unit which,~~ unit that receives the initialization signal from the initialization signal generation unit, checks whether a coding rate of ~~a second~~ the second data stream ~~to be decoded subsequently to a first data stream that has been decoded~~ is larger than a coding rate of the first data stream, and provides the initialization signal ~~to said~~ to the Viterbi decoder ~~only if the~~ when the coding rate of the second data stream is larger than the coding rate of the first data stream.

5. (Currently Amended) The data receiving system according to claim 3, further comprising a distribution unit ~~which distributes the~~ that divides the time division multiplexed data decoded by the Viterbi decoder into a plurality of information ~~corresponding respectively to the plurality code streams, after the multiplexed data are decoded~~ corresponding to the plurality of data streams.

6. (Currently Amended) The data receiving system according to claim 3, further comprising a multiplexed information decoding ~~unit which~~ unit that extracts and decodes multiplexed information ~~from the multiplexed data when the multiplexed information decoding unit receives multiplexed data including the multiplexed information~~ included in the time division multiplexed data.

7. (Currently Amended) The data receiving system according to claim 20, further comprising a register ~~storing~~ that stores therein the predetermined value ~~that is~~ variably set in accordance with a signal the register receives.

8. (Canceled)

9. (Currently Amended) A decoder comprising:

a Viterbi decoder ~~which decodes~~ that decodes time division multiplexed data composed by time division multiplexing including a plurality of data streams including at least convolutionally encoded with different coding rates and modulated using any one of BPSK, QPSK, and 8PSK data streams, ~~the multiplexed data coded with at least a convolution code, a coding rate and a modulation scheme being set individually for each of the data streams; and~~

an initialization signal generation unit ~~which outputs an initialization signal for initializing, at a moment when the 8PSK data stream is changed into the QPSK data stream or BPSK data stream, or when the QPSK data stream is changed into the BPSK data stream, a path metric calculated by said Viterbi decoder, so that the path metric is not calculated based on a previously input data stream that includes an error that~~ outputs an initialization signal for a path metric to the Viterbi decoder after completion of decoding of a first data stream, which is included in the time division multiplexed data and modulated using any one of 8PSK and QPSK, and before performing decoding of a second data stream, which is included in the time division multiplexed data and

modulated using any one of QPSK and BPSK, except when both of the first data stream and the second data stream are modulated using QPSK.

10. (Currently Amended) A data transmitting and receiving system comprising:

a transmitting unit ~~which transmits a time~~ that transmits time division multiplexed data including a plurality of data streams ~~including at least~~ convolutionally encoded with different coding rates and modulated using any one of BPSK, QPSK, and 8PSK data streams; and

a receiving unit ~~which~~ unit that receives and decodes the time division multiplexed data; and includes:

~~said receiving unit including~~

a Viterbi decoder ~~which decodes said~~ that decodes the time division multiplexed data; data;

a signal-to-noise ratio monitor ~~which detects~~ that detects a strength of a noise included in the time division multiplexed data; and

an initialization signal generating unit ~~which outputs an initialization signal to said Viterbi decoder on the basis of the noise detected so as to initialize, at a moment when at a moment when the 8PSK data stream is changed into the QPSK data stream or BPSK data stream, or when the QPSK data stream is changed into the BPSK data stream, a path metric calculated by said Viterbi decoder, so that the path metric is not calculated based on a previously input data stream that includes an error~~ that outputs, based on the strength of the noise, an initialization signal for a path metric to the Viterbi

decoder after completion of decoding of a first data stream, which is included in the time division multiplexed data and modulated using any one of 8PSK and QPSK, and before performing decoding of a second data stream, which is included in the time division multiplexed data and modulated using any one of QPSK and BPSK, except when both of the first data stream and the second data stream are modulated using QPSK.

11. (Currently Amended) ~~A data~~ The data transmitting and receiving system according to claim 10, wherein the initialization signal is output to said ~~Viterbi~~ the Viterbi decoder ~~only if~~ when a coding rate of a the second data stream ~~to be decoded subsequently to a first data stream that has been decoded~~ is larger than a coding rate of the first data stream.

12. (Currently Amended) ~~A decoding method of decoding time division multiplexed data using the Viterbi decoding method, wherein the multiplexed data are composed by time division multiplexing including a plurality of data streams including at least convolutionally encoded and modulated using any one of BPSK, QPSK, and 8PSK data streams, the multiplexed data are coded with at least a convolution code, the decoding method comprising the steps of:~~

decoding, using a Viterbi decoding algorithm, a first data stream that is included in the time division multiplexed data and modulated using any one of 8PSK and QPSK;

decoding, using the Viterbi decoding algorithm, a second data stream that is included in the time division multiplexed data and modulated using any one of QPSK and BPSK; and

~~initializing a path metric calculated based on the Viterbi decoding method at a moment when the 8PSK data stream is changed into the QPSK data stream or BPSK data stream, or when the QPSK data stream is changed into the BPSK data stream so that the path metric is not calculated based on a previously input data stream that includes an error, after completion of the decoding of the first data stream and before performing the decoding of the second data stream, a path metric that has been calculated before the completion of the decoding of the first data stream, except when both of the first data stream and the second data stream are modulated using QPSK.~~

13. (Currently Amended) A data receiving system comprising:

~~a Viterbi decoder which decodes that decodes time division multiplexed data composed by time division multiplexing including a synchronous code, multiplex information, and a plurality of data streams including at least convolutionally encoded with different coding rates and modulated using any one of BPSK, QPSK, and 8PSK data streams, the multiplexed data coded with at least a convolution code, a coding rate and a modulation scheme being set individually for each of the data streams; and~~

~~an initialization signal generation unit which outputs an initialization signal for initializing a path metric calculated by said Viterbi decoder, at a moment when a synchronous signal is detected from the multiplexed data and the 8PSK data stream is changed into the QPSK data stream or BPSK data stream, or the QPSK data stream is changed into the BPSK data stream, so that the path metric is not calculated based on a previously input data stream that includes an error that outputs an initialization signal for a path metric to the Viterbi decoder after completion of decoding of a first data~~

stream, which is included in the time division multiplexed data and modulated using any one of 8PSK and QPSK, and before performing decoding of a second data stream, which is included in the time division multiplexed data and modulated using any one of QPSK and BPSK, except when both of the first data stream and the second data stream are modulated using QPSK.

14. (Currently Amended) The data receiving system according to claim 13, further comprising a synchronizer ~~which detects the synchronous signal and that~~ outputs a control signal to the initialization signal generation unit ~~when~~ upon detecting the synchronous signal is detected code.

15. (Currently Amended) A decoder comprising:
a Viterbi decoder ~~which that~~ decodes time division multiplexed data composed by time division multiplexing including a synchronous code, multiplex information, and a plurality of data streams including at least convolutionally encoded with different coding rates and modulated using any one of BPSK, QPSK, and 8PSK data streams, the multiplexed data coded with at least a convolution code, a coding rate and a modulation scheme being set individually for each of the data streams; and

an initialization signal generation unit which outputs an initialization signal for initializing a path metric calculated by said Viterbi decoder, at a moment when a synchronous signal is detected from the multiplexed data and the 8PSK data stream is changed into the QPSK data stream or BPSK data stream, or the QPSK data stream is changed into the BPSK data stream, so that the path metric is not calculated based on

~~a previously input data stream that includes an error~~ that outputs an initialization signal for a path metric to the Viterbi decoder after completion of decoding of a first data stream, which is included in the time division multiplexed data and modulated using any one of 8PSK and QPSK, and before performing decoding of a second data stream, which is included in the time division multiplexed data and modulated using any one of QPSK and BPSK, except when both of the first data stream and the second data stream are modulated using QPSK.

16. (Currently Amended) The data decoder according to claim 15, further comprising a synchronizer ~~which detects the synchronous signal and~~ that outputs a control signal to the initialization signal generation unit ~~when~~ upon detecting the synchronous ~~signal is detected~~ code.

17. (Currently Amended) A data transmitting and receiving system comprising:

a transmitting unit ~~which~~ that transmits time division multiplexed data composed by ~~time division multiplexing~~ including a plurality of data streams, ~~the multiplexed data coded with at least a convolution code, a coding rate and a modulation scheme being set individually for each of the data streams~~ convolutionally encoded with different coding rates and modulated using any one of BPSK, QPSK, and 8PSK; and

a receiving unit ~~which~~ that receives and decodes the time division multiplexed data and includes;

~~said receiving unit including,~~

a Viterbi decoder ~~which~~ that decodes the time division multiplexed data;
and

~~an initialization signal generation unit which outputs an initialization signal for initializing a path metric calculated by said Viterbi decoder at a moment when the 8PSK data stream is changed into the QPSK data stream or BPSK data stream, or when the QPSK data stream is changed into the BPSK data stream, so that the path metric is not calculated based on a previously input data stream that includes an error~~
that outputs an initialization signal for a path metric to the Viterbi decoder after completion of decoding of a first data stream, which is included in the time division multiplexed data and modulated using any one of 8PSK and QPSK, and before performing decoding of a second data stream, which is included in the time division multiplexed data and modulated using any one of QPSK and BPSK, except when both of the first data stream and the second data stream are modulated using QPSK.

18. (Currently Amended) The ~~decoding~~ method according to claim 1, further comprising:

measuring a strength of a noise included in the time division multiplexed data;
and

checking whether the strength ~~of the noise measured~~ is equal to or greater than a predetermined value; and, wherein

~~initializing the path metric if~~ is initialized at the initializing when the strength ~~of the noise measured~~ is equal to or greater than a predetermined value.

19. (Currently Amended) The ~~decoding~~ method according to claim 1, wherein ~~the one of the~~ first data ~~streams~~ stream has a coding rate of a ~~high~~ low error correction ability, and the second data stream ~~including the error~~ has a coding rate of a ~~low~~ high error correction ability.

20. (Currently Amended) The data receiving system according to claim 3, further comprising:

a signal-to-noise ratio monitor ~~which~~ that measures a strength of a noise included in the time division multiplexed data; and

a comparison unit ~~which~~ that checks whether the strength ~~of the noise measured~~ is equal to or greater than a predetermined value and outputs a notification signal to the initialization signal generation unit if when the strength ~~of the noise measured~~ is equal to or greater than the predetermined value, wherein

~~wherein~~ the initialization signal generation unit outputs the initialization signal ~~for initializing the path metric~~ upon receiving the notification signal from the comparison unit.

21. (Currently Amended) The data receiving system according to claim 3, wherein ~~the one of the~~ first data ~~streams~~ stream has a coding rate of a ~~high~~ low error correction ability, and the second data stream ~~including the error~~ has a coding rate of a ~~low~~ high error correction ability.

22. (Currently Amended) The decoder according to claim 9, further comprising:

a signal-to-noise ratio monitor ~~which~~ that measures a strength of a noise included in the time division multiplexed data; and

a comparison unit ~~which~~ that checks whether the strength ~~of the noise measured~~ is equal to or greater than a predetermined value and outputs a notification signal to the initialization signal generation unit ~~[[if]]~~ when the strength ~~of the noise measured~~ is equal to or greater than the predetermined value, wherein

~~wherein~~ the initialization signal generation unit outputs the initialization signal ~~for initializing the path metric~~ upon receiving the notification signal from the comparison unit.

23. (Currently Amended) The decoder according to claim 9, wherein ~~the one~~ of the first data ~~streams~~ stream has a coding rate of ~~a high~~ low error correction ability, and the second data stream ~~including the error~~ has a coding rate of ~~a low~~ high error correction ability.

24. (Currently Amended) The ~~decoding method of decoding multiplexed data~~ using the Viterbi decoding method, ~~wherein the multiplexed data are composed by time division multiplexing a plurality of data streams, the multiplexed data are coded with at least a convolution code,~~ according to claim 12, further comprising:

measuring a strength of a noise included in the time division multiplexed data; and

checking whether the strength of ~~the noise measured~~ is equal to or greater than a predetermined value; and, wherein

~~initializing the path metric~~ [[if]] is initialized at the initializing when the strength of ~~the noise measured~~ is equal to or greater than a predetermined value.

25. (Currently Amended) The ~~decoding method of decoding multiplexed data using the Viterbi decoding method, wherein the multiplexed data are composed by time division multiplexing a plurality of data streams, the multiplexed data are coded with at least a convolution code, according to claim 12, wherein the one of the first data streams~~ stream has a coding rate of a ~~high~~ low error correction ability, and the second data stream ~~including the error~~ has a coding rate of a ~~low~~ high error correction ability.

26. (Currently Amended) The data receiving system according to claim [[3]] 13, further comprising:

a signal-to-noise ratio monitor ~~which~~ that measures a strength of a noise included in the time division multiplexed data; and

a comparison unit ~~which~~ that checks whether the strength of ~~the noise measured~~ is equal to or greater than a predetermined value and outputs a notification signal to the initialization signal generation unit [[if]] when the strength of ~~the noise measured~~ is equal to or greater than the predetermined value~~[[;]]~~, wherein

~~wherein~~ the initialization signal generation unit outputs the initialization signal ~~for initializing the path metric upon receiving the notification signal~~ from the comparison unit.

27. (Currently Amended) The data receiving system according to claim ~~[[3]]~~ 13, wherein ~~the one of the first data streams stream~~ has a coding rate of a ~~high~~ low error correction ability, and the second data stream ~~including the error~~ has a coding rate of a ~~low~~ high error correction ability.

28. (Currently Amended) The decoder according to claim ~~[[9]]~~ 15, further comprising:

a signal-to-noise ratio monitor ~~which~~ that measures a strength of a noise included in the time division multiplexed data; and

a comparison unit ~~which~~ that checks whether the strength ~~of the noise measured~~ is equal to or greater than a predetermined value and outputs a notification signal to the initialization signal generation unit when ~~of the strength of the noise measured~~ is equal to or greater than the predetermined value, wherein

~~wherein~~ the initialization signal generation unit outputs the initialization signal ~~for initializing the path metric upon receiving the notification signal~~ from the comparison unit.

29. (Currently Amended) The decoder ~~data receiving system~~ according to claim ~~[[9]]~~ 15, wherein ~~the one of the first data streams stream~~ has a coding rate of a ~~high~~ low error correction ability, and the second data stream ~~including the error~~ has a coding rate of a ~~low~~ high error correction ability.

30. (Currently Amended) The data transmitting and receiving system according to claim 17, further comprising:

a signal-to-noise ratio monitor ~~which~~ that measures a strength of a noise included in the time division multiplexed data; and

a comparison unit ~~which~~ that checks whether the strength of ~~the noise measured~~ is equal to or greater than a predetermined value and outputs a notification signal ~~[[if]]~~ to the initialization signal generation unit when the strength of ~~the noise measured~~ is equal to or greater ~~then~~ than the predetermined value, wherein

~~wherein~~ the initialization signal generation unit outputs the initialization signal ~~for initializing the path metric~~ upon receiving the notification signal from the comparison unit.